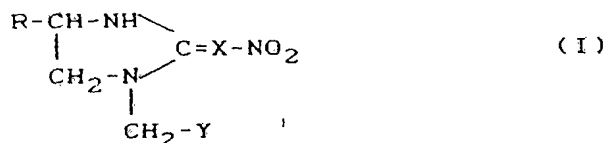




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**AGENTS AGAINST KERATIN PESTS**
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- (56) Prior Art Documents  
**AU 584388 52866/86 C07D 417/06 413/06**
- (57) Claim

1. An agent for use in combating keratin-digesting pests in keratin-containing textile materials, which agent is characterized in that it contains, as active substance, a combination of nitromethylene- and/or nitroimino-imidazolines on the one hand; and cyclopropanecarboxylic acid phenoxybenzyl esters or 5-phenylcarbamoyle barbituric acid derivatives or chloromethylsulphonamidodiphenyl ethers or diphenylureas or any combination thereof on the other hand; together with at least one auxiliary substance, said auxiliary substance being suitable for finishing the active substance for textile application, the agent being further characterized in that the active substance includes a compound of the formula

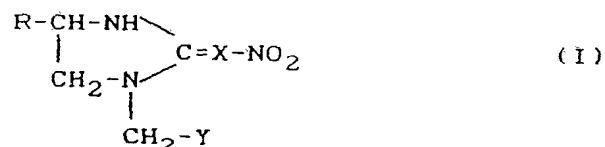


wherein

- R represents H or CH<sub>3</sub>  
X represents CH or N and  
Y represents a pyridine, pyrazine or pyrimidine radical which is optionally substituted by halogen or C<sub>1</sub>-C<sub>4</sub>-alkyl.

3. A process for the treatment of keratin-containing textile materials for protection from infestation and ingestion damage by keratin digesting pests, characterized in that there is used, in carrying out such treatment, an agent according to either one of claims 1 or 2.

4. A process for the treatment of keratin-containing textile materials for protection from infestation and ingestion damage by keratin-digesting pests characterized in that there is used, in carrying out such treatment, an agent that contains a nitromethylene and/or nitroiminoimidazoline as active substance, together with at least one auxiliary substance suitable for finishing the active substance for textile application, the agent in turn being further characterized in that the active substance includes a compound of the formula



wherein

- R represents H or CH<sub>3</sub>,  
X represents CH or N and  
Y represents a pyridine, pyrazine or pyrimidine radical which is optionally substituted by halogen or C<sub>1</sub>-C<sub>4</sub>-alkyl.

5. A process according to claim 4 characterized in that the compound is

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Patents Act

FORM 10

COMPLETE SPECIFICATION

(ORIGINAL)

Application Number:  
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Complete Specification Lodged:  
Accepted:  
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Related Art:

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Complete specification for the invention entitled

"Agents against keratin pests."

The following statement is a full description of this invention, including the best method of performing it known to me:-

5

Agents against keratin pests

10 The invention relates to an agent for combating  
moths and other keratin-digesting textile pests, which  
is based on nitromethylene- or nitroiminoimidazolines  
and mixtures thereof, with cyclopropanecarboxylic acid  
phenoxybenzyl esters, 5-phenylcarbamoyl barbituric acid  
derivatives, chloromethylsulphonamidodiphenyl ethers  
and/or diphenylureas.

15 It is known that this group of substances has  
insecticidal properties and is therefore recommended in  
particular for use in the agricultural sector (compare  
DE-A-2,514,402 and EP-A-192,060 = US-A-4,747,060).

20 It is also known that cyclopropanecarboxylic acid  
phenoxybenzyl esters of the most diverse forms have  
powerful insecticidal properties (cf. for example GB A  
1,413,491 and DE-A 2,709,264), that 5-phenylcarbamoyl  
barbituric acid compounds have insecticidal properties  
(cf. CH-A 653,840 and EP-A 0,169,168), that chloro-  
25 aminodiphenyl ethers e.g. 4,5,2',4',4'-pentachloro-2-  
chloromethylsulphenamidodiphenyl ether, have an  
ingestion-inhibiting action against keratin-digesting  
pests, when applied to textiles (cf. EP-A 311,851) and  
that diphenylureas of a specific composition also have  
30 an ingestion-inhibiting action against keratin-digesting  
pests, when applied to textiles (cf. EP 0,318,431 A2).

35 It has now been found that these substances also  
have an excellent ingestion-preventing action against  
moths and other keratin-digesting insects when they are  
used under the conditions of the textile industry in  
combination with finishing auxiliaries customary in this  
branch.

Le A 26 717-Foreign Countries

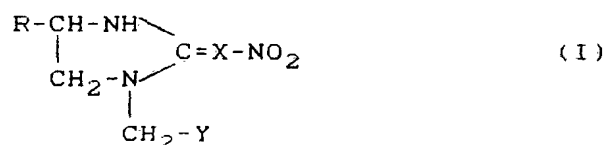
This effect is to be regarded as surprising, since insecticides which are used as spraying agents in the agricultural sector can in no way generally also be used for preventing damage to textiles by the keratin pests of specialized digestion.

It is furthermore remarkable that the agents according to the invention have a higher activity than comparable known protecting agents.

The significantly more advantageous eco-toxicological properties, especially in respect of toxicity to fish, of the compounds according to the invention in comparison with the agents known from the prior art must also be emphasised.

Finally it must be considered particularly surprising that mixtures of compounds I-V display a marked synergistic action in combating keratin pests, compared with the individual components.

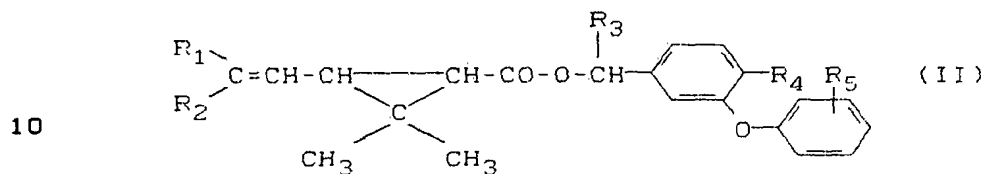
Agents which are preferably to be employed correspond to the formula



wherein

- R represents H or CH<sub>3</sub>,  
X represents CH or N and  
Y represents a pyridine, pyrazine or pyrimidine radical which is optionally substituted by halogen or C<sub>1</sub>-C<sub>4</sub>-alkyl.

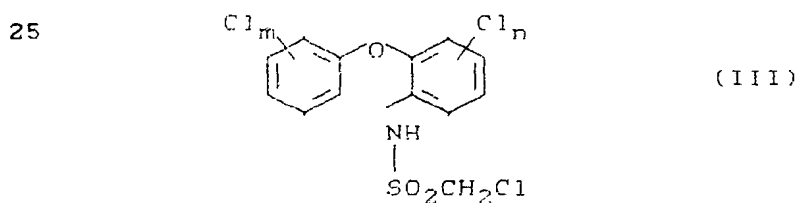
Where cyclopropanecarboxylic acid phenoxybenzyl  
 5 esters are used, those of the formula



in which

- 15  $R_1$  represents hydrogen, alkyl or halogen  
 $R_2$  represents alkyl, halogen or phenyl which is  
 optionally substituted by halogen,  
 $R_3$  represents hydrogen, cyano or ethinyl,  
 $R_4$  represents hydrogen or halogen and  
 20  $R_5$  represents hydrogen or halogen,  
 are preferred.

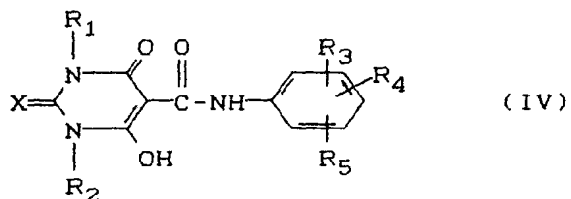
Of the chloromethylsulphonamidodiphenyl ethers,  
 those of the formula



30 in which the sum of m and n is 4-7, are preferably  
 employed.

Where 5-phenylcarbamoylbarbituric acid derivatives  
 are used as an additional component, those of the  
 35 formula

5



10

are preferably used. In this formula

X is oxygen or sulphur,

R<sub>1</sub> and R<sub>2</sub> are in each case alkyl having 3 or 4 C atoms,  
alkenyl having 3 or 4 C atoms, benzyl or  
optionally substituted phenyl,

15

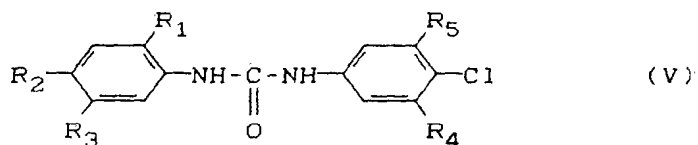
R<sub>3</sub> is halogen, nitro or C(halogen)<sub>3</sub>,

R<sub>4</sub> is hydrogen, halogen or C(halogen)<sub>3</sub> and

R<sub>5</sub> is hydrogen, halogen, methyl or methoxy.

If diphenylureas are used, those of the formula

20



25

wherein

R<sub>1</sub> denotes hydrogen or 4-chlorophenoxy-6-sulphonate,

R<sub>2</sub> denotes hydrogen or chlorine,

30

R<sub>3</sub> denotes hydrogen or trifluoromethyl,

R<sub>4</sub> denotes hydrogen or chlorine and

R<sub>5</sub> denotes hydrogen or trifluoromethyl.

35

are preferably used.

5 "Halogen" here is understood as meaning, in particular, fluorine and - above all - chlorine.

The preferred alkyl radical is the methyl group.

Compounds of the formula (I) in which X = N and Y denotes a chloropyridine radical are particularly  
10 preferred,

The substances per se - as already mentioned - are known and are described in detail in EP-A-192,060.

The finishing of these substances for textile application is also carried out by known methods by  
15 means of customary auxiliaries, such as, for example, emulsifiers, water-miscible organic solvents, standardizing agents, antifreeze agents and the like for a liquid finish.

The keratin pests include  
20 from the order of the Tineidae (true moths) for example *Tineola bisselliella* (clothes moth),  
*Tinea pellionella* (fur moth) and  
*Hofmannophila pseudospretella* (seed moth)  
and from the series of beetles the larvae of two genera  
25 of Dermestidae (bacon beetle), for example  
*Anthrenus verbasci* (mullen blossom beetle),  
*Anthrenus pimpinellae* (pimpernel blossom beetle),  
*Anthrenus scrophulariae* (common carpet beetle),  
30 *Anthrenus fasciatus* (ribboned carpet beetle),  
*Attagenus pello* (spotted fur beetle),  
*Attagenus piceus* (dark fur beetle).

35



5       The protective substances according to the invention can be used in various ways, for example in powder form for cleaning furs and skins, in a powder blend for repelling or destroying pests, or in the form of emulsions or dispersions from an aqueous liquor or from organic solvents by the method of drycleaning.

10       They can be used in practically all the states of processing and all the wet application and spraying processes customary in the textile industry, if appropriate together with other finishing processes, on wool, woollen textiles and wool-containing textiles as well  
15 as feathers, hair and related material or material produced therefrom.

20       The agent can be added, for example, to the dyebath before the customary dyeing process, but it can also be applied during washing of wool. The treatment is preferably carried out in an aqueous medium.

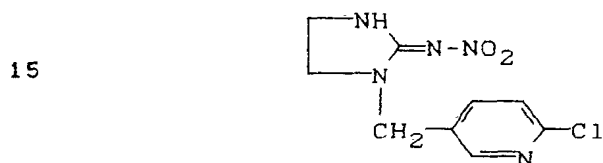
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Example 1

- 5           Wool, woollen yarn or a sheet-like structure of  
wool is introduced at 40°C in a liquor ratio of 10:1  
into a treatment bath containing, per litre of water,  
3       g of acetic acid (60% strength),  
5       g of calcined sodium sulphate,  
10       1.5 g of an addition product of stearyl-methylethanol-  
amine and 40 mol of ethylene oxide,  
0.025 g of the compound of the formula



and

- 20           2       g of Acid Yellow 151 (= C.J. 13 906)

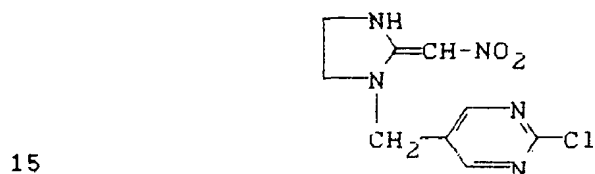
25           The bath is then heated to the boiling point and  
the dyeing is finished in the customary manner. The  
yellow-dyed woollen material has good protection from  
being eaten by moths and beetles.

Example 2

- 30           Carpet yarn which consists of a wool/polyamide  
mixture in a ratio of 80:20 is introduced at 40°C in a  
liquor ratio of 25:1 into a treatment bath which con-  
tains, per litre of water,

35

- 0.4 g of acetic acid (60% strength),  
 5 1.2 g of ammonium sulphate,  
 0.6 g of a condensation product of phenylsulphonic  
 acid, dihydroxydiphenyl sulphone and formaldehyde,  
 0.8 g of an addition product of stearyl-methylethanol-  
 amine and 40 mol of ethylene oxide,  
 10 0.1 g of the compound of the formula



and

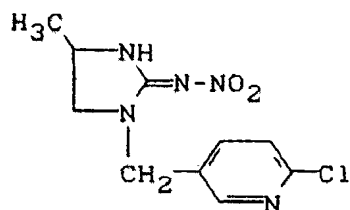
- 1.5 g Acid Yellow 151 (= C.J. 13 906)  
 20

The mixture is then heated to the boiling point and the dyeing is finished in the customary manner. The yellow-dyed woollen content of the carpet yarn has good protection from being eaten by moths and beetles.

- 25 Good results are also obtained if a treatment bath which contains, per litre of water,  
 0.4 g of acetic acid (60% strength),  
 1.2 g of ammonium sulphate,  
 1.2 g of <sup>®</sup>EDOLAN PAW fl.,  
 30 0.4 g of <sup>®</sup>AVOLAN S,  
 0.6 g of Acid Yellow 49 (=C.I. 18 640) and the above-  
 mentioned amounts of the compound of the formula

35

5



is used.

10

### Example 3

500 kg of carpet yarn consisting of wool or a wool mixture, preferably with polyamide in a ratio of 80:20, are washed and treated per hour by the continuous washing process on a washing unit customary in industry.

For this, in the last tank of the washing unit the liquor is brought to a pH of below 7 with dilute acetic acid and 0.05 g per litre of the active substance mentioned in Example 1 is added.

The treatment is carried out at 50°C.

To maintain the active compound concentration in the treatment bath, the bath is topped up with 125 g of the abovementioned compound.

This topping up is performed by continuous addition of an aqueous solution to the bath throughout the entire treatment time. The carpet yarn treated in this way has good protection from being eaten by moths and beetles. This also applies to the final article produced therefrom.

35

#### Example 4

5           1,000 kg of raw wool are washed and treated per  
hour by the continuous washing process in a Leviathan  
or a comparable unit (for example Mini-Bowl).

For this, in the last tank of the Leviathan the  
liquor is brought to a pH of below 7 with dilute acetic  
10 acid and  
0.05 g per litre of a compound according to Example 1  
is added.

The treatment is carried out at 70°C.

To maintain the active compound concentration in  
15 the treatment bath, the bath is topped up with 250 g of  
the abovementioned compound.

This topping up is performed by continuous addition  
of an aqueous solution to the bath throughout the entire  
treatment time. The raw wool treated in this way has  
20 good protection from being eaten by moths and beetles.  
The wool can be passed to all the further processing  
processes customary in the textile industry.

#### Example 5

5,000 kg of raw wool are treated by the spray pro-  
25 cess during mixing in preparation for spinning. The  
spray application here is an integrated constituent of  
the spinning oil in accordance with the following recom-  
mended recipe.

	Total application	625 l,
30	containing	75 l of a spinning oil (®Solfil 591)
		1,250 g of the active sub- stance according to Example 1
35		the remainder being water.

5 The raw wool treated in this way has a good protection from being eaten by moths and beetles. The wool can be passed to all the further processing processes customary in the textile industry.

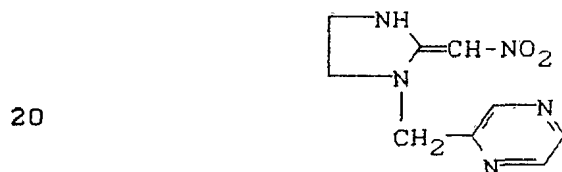
Example 6

10 Wool, woollen yarn or a sheet-like structure of wool is introduced at 20 to 40°C in a liquor ratio of 10:1 into a treatment bath which contains, per litre of water,

3 g of acetic acid (60% strength),

15 1 g of an ammonium salt of a C<sub>12</sub>-C<sub>14</sub>-alkylsulphonate mixture and

0.025 g of the compound of the formula



The treatment bath is then heated to 60°C and left at this temperature.

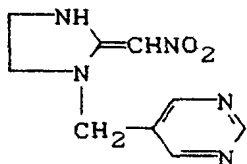
25 The woollen material treated in this way has a good protection from being eaten by moths and beetles.

Example 7

30 Carpet goods which contain 2,000 g/m<sup>2</sup> in the pile and have a backing which consists of polypropylene or jute is sprayed with a solution which contains, per litre of water and at a spray application of 20% of the weight of the goods

35

1 g of an ammonium salt of C<sub>12</sub>-C<sub>14</sub>-alkylsulphonate  
mixture and  
1.25 g of the compound of the formula



The spray application is performed uniformly over the entire width of the goods, it being necessary for the spray cones to overlap slightly. The goods are then passed to the drier.

The carpet goods treated in this way have good protection from being eaten by moths and beetles in the entire pile material, both on the pile surface and within the depth of the pile.

Example 8

Carpet goods which contain 2,000 g/m<sup>2</sup> in the pile and have a backing consisting of polypropylene or jute are treated by the foam application process. The foam application can be performed here in accordance with the following system:

Speed	4 m/minute
Wet application	30%
Foaming	1:50
Cushion pressure	0.4 bar.

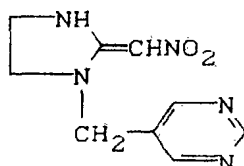
5       The liquor to be foamed contains, per litre of  
water,  
5       g of dodecyloxyethyl-dihydroxyethyl-amine oxide and  
0.85 g of the active substance of Example 7.

10       The penetration into the depth of the pile is good,  
without the moisture entering the backing. The carpet  
goods treated in this way have a good protection from  
being eaten by moths and beetles both on the pile  
surface and in the depth of the pile.

Example 9

15       Woollen piece goods weighing 500 g/m<sup>2</sup> are treated  
on a padder so that a liquor pick-up of 100%, based on  
the weight of the goods, results.

20       The liquor contains, per litre of water,  
2       g of an ammonium salt of a C<sub>12</sub>-C<sub>14</sub>-alkylsulphonate  
mixture and  
0.25 g of the compound of the formula



30       The goods are passed from the padder into the drier  
or stenter.

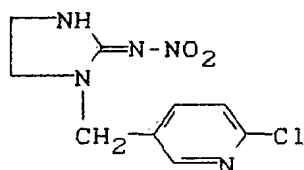
35       The piece goods treated in this way have good pro-  
tection from being eaten by moths and beetles.



Example 10

- 5 Wool, woollen yarn or a sheet-like structure of wool is introduced at 40°C in a liquor ratio of 10:1 into a treatment bath containing, per litre of water,  
3 g of acetic acid (60% strength),  
5 g of calcined sodium sulphate,  
10 1,5 g of an addition product of stearyl-methylethanol-amine and 40 mol of ethylene oxide,  
0,25 mg of the compound of the formula

15

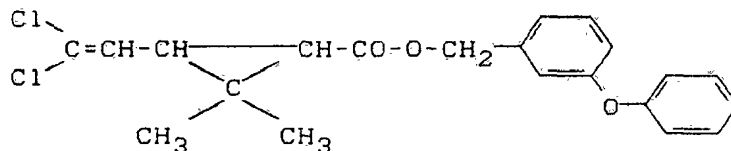


20

and

0,75 mg of the compound of the formula

25



30

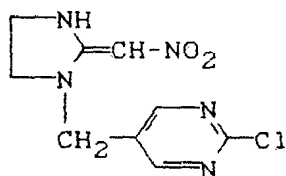
and

2 g of Acid Yellow 151 (=C.I. 13 906).

- The bath is then heated to the boiling point and the dyeing is finished in the customary manner. The  
35 yellow-dyed woollen material has good protection from being eaten by moths and beetles.

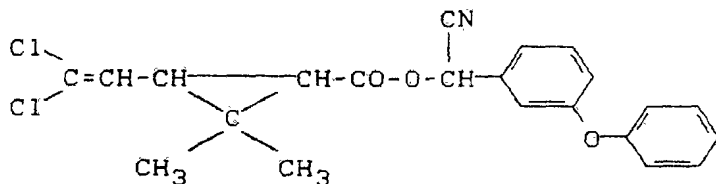
Example 11

- 5 Carpet yarn which consists of a wool/polyamide mixture in a ratio of 80:20 is introduced at 40°C in a liquor ratio of 25:1 into a treatment bath which contains, per litre of water,
- 0.4 g of acetic acid (60% strength),
- 10 1.2 g of ammonium sulphate,
- 0.6 g of a condensation product of phenylsulphonic acid, dihydroxydiphenyl sulphone and formaldehyde,
- 0.8 g of an addition product of stearyl-methylethanolamine and 40 mol of ethylene oxide,
- 15 0.25 mg of the compound of the formula



and

- 25 0.75 mg of the compound of the formula



and

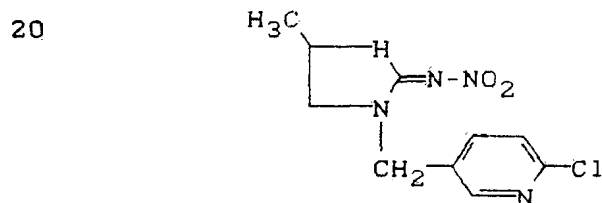
- 35 1.5 g Acid Yellow 151 (= C.J. 13 906).

5 The mixture is then heated to the boiling point and the dyeing is finished in the customary manner. The yellow-dyed woollen content of the carpet yarn has good protection from being eaten by moths and beetles.

Example 12

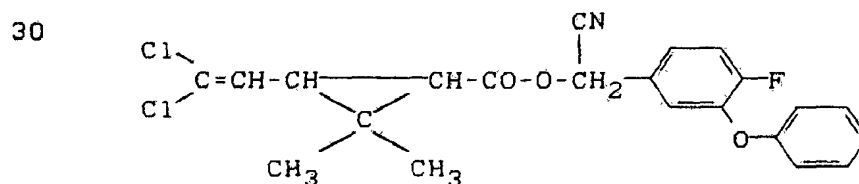
10 500 kg of carpet yarn consisting of wool or a wool mixture, preferably with polyamide in a ratio of 80:20, are washed and treated per hour by the continuous washing process on a washing unit customary in industry.

15 For this, in the last tank of the washing unit the liquor is brought to a pH of below 7 with dilute acetic acid and 0.5 mg per litre of the compound of the formula (A)



25 and

1.5 mg per litre of the compound of the formula (B)



35 are added.

The treatment is carried out at 50°C.

5 To maintain the active compound concentration in the treatment bath, the bath is topped up with 1.25 g of the abovementioned compound of the formula (A)

and

10 3.75 g of the abovementioned compound of the formula (B).

This topping up is performed by continuous addition of an aqueous solution to the bath throughout the entire treatment time. The carpet yarn treated in this way has good protection from being eaten by moths and beetles. This also applies to the final article produced therefrom.

20

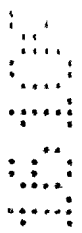
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Figure 1 shows a schematic diagram of a 10x10 grid representing a 2D lattice. The grid is divided into four quadrants by a vertical line at column 5 and a horizontal line at row 5. The top-left quadrant (columns 1-4, rows 1-4) contains a 4x4 grid of dots. The top-right quadrant (columns 6-9, rows 1-4) contains a 4x4 grid of dots. The bottom-left quadrant (columns 1-4, rows 6-9) contains a 4x4 grid of dots. The bottom-right quadrant (columns 6-9, rows 6-9) contains a 4x4 grid of dots. The central 2x2 area (columns 5-6, rows 5-6) is empty. The grid is labeled with '1' at the top-left corner, '2' at the top-right corner, '3' at the bottom-left corner, and '4' at the bottom-right corner.

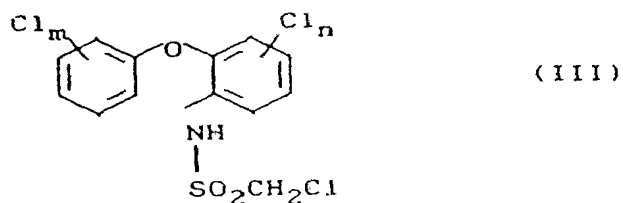
1



$R_4$  represents hydrogen or halogen and

$R_5$  represents hydrogen or halogen,

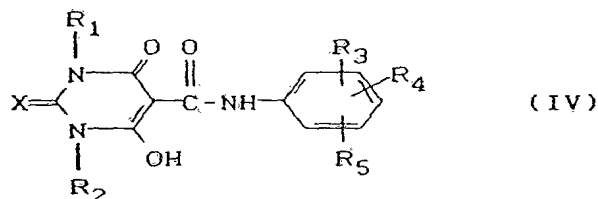
or



in which

the sum of m and n is 4-7,

or



in which

X denotes oxygen or sulphur,

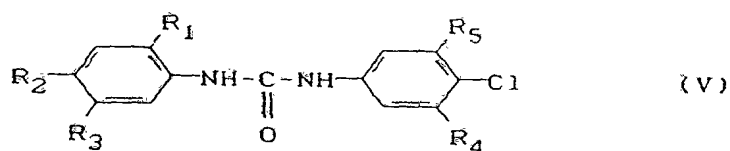
$R_1$  and  $R_2$  in each case denote alkyl having 3 or 4 C atoms, alkenyl having 3 or 4 C atoms, benzyl or optionally substituted phenyl,

$R_3$  denotes halogen, nitro or  $C(\text{halogen})_3$ ,

$R_4$  denotes hydrogen, halogen or  $C(\text{halogen})_3$  and

$R_5$  denotes hydrogen, halogen, methyl or methoxy

or



wherein

R<sub>1</sub> denotes hydrogen or 4-chlorophenoxy-6-sulphonate,

R<sub>2</sub> denotes hydrogen or chlorine

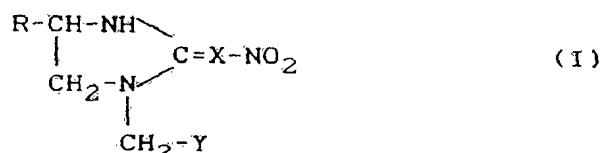
R<sub>3</sub> denotes hydrogen or trifluoromethyl,

R<sub>4</sub> denotes hydrogen or chlorine and

R<sub>5</sub> denotes hydrogen or trifluoromethyl.

3. A process for the treatment of keratin-containing textile materials for protection from infestation and ingestion damage by keratin digesting pests, characterized in that there is used, in carrying out such treatment, an agent according to either one of claims 1 or 2.

4. A process for the treatment of keratin-containing textile materials for protection from infestation and ingestion damage by keratin-digesting pests characterized in that there is used, in carrying out such treatment, an agent that contains a nitromethylene and/or nitroiminoimidazoline as active substance, together with at least one auxiliary substance suitable for finishing the active substance for textile application, the agent in turn being further characterized in that the active substance includes a compound of the formula



wherein

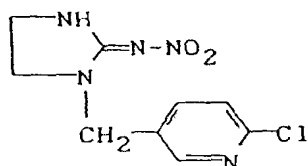
R represents H or CH<sub>3</sub>,

X represents CH or N and

Y represents a pyridine, pyrazine or pyrimidine radical which is optionally substituted by halogen or C<sub>1</sub>-C<sub>4</sub>-alkyl.

5. A process according to claim 4 characterized in that the compound is





6. A process according to any one of claims 3 to 5, characterized in that the treatment is carried out in an aqueous medium.

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